

# Social Stories: Mechanisms of Effectiveness in Increasing Game Play Skills in Children Diagnosed with Autism Spectrum Disorder Using a Pretest Posttest Repeated Measures Randomized Control Group Design

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**Abstract** An increasing body of literature has indicated that social stories are an effective way to teach individuals diagnosed with autism appropriate social behavior. This study compared two formats of a social story targeting the improvement of social skills during game play using a pretest posttest repeated measures randomized control group design. A total of 45 children diagnosed with Autism Spectrum Disorder (ASD) ages 7–14 were randomly assigned to standard, directive, or control story conditions. Results demonstrated that the standard and directive story formats were equally as effective in eliciting, generalizing and maintaining the targeted social skills in participants who had prior game play experience and Verbal Comprehension Index (VCI) scores from the WISC-IV intelligence test in the borderline range or above.

**Keywords** Autism · Asperger · Social stories · Intelligence · Play

Various types of interventions are implemented to improve the behavior, communication, cognitive skills, and social skills of individuals diagnosed with autism, nevertheless, “The treatment of social skills deficits remains one of the most challenging areas in meeting the needs of people with autism” (Weiss and Harris 2001, p. 785). The number of individuals diagnosed with autism is rapidly increasing (e.g. Blaxill 2004; Department of Developmental Services 1999; Department of Developmental Services 2003; M.I.N.D. Institute 2002), and it is imperative to develop more effective treatment strategies in order to improve their quality of life.

Social skills are complex, and even individuals diagnosed with autism who are high functioning “often experience considerable difficulty with social situations” (Kuo and Mirenda 2003, p. 219) and tend to have pronounced deficits in comprehension, notably social comprehension (e.g., Goldstein et al. 2001; Lincoln et al. 1988). Undesirable social behaviors in this population, such as poor eye contact or a lack of an awareness of others may hinder individuals diagnosed with autism from actively participating in simple social play or games (American Psychiatric Association 2000, p. 70). Individuals diagnosed with autism do not tend to initiate social contact or play interactively with peers. This may be due to a lack of understanding of social norms. The American Psychiatric Association reports, “Younger individuals may have little or no interest in establishing friendships. Older individuals may have an interest in friendships but lack understanding of the conventions of social interaction.”

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(American Psychiatric Association 2000, p. 70). Thus, if individuals diagnosed with autism were given direct access to social information in a manner that is easily understood and clearly identifies the behavior expected of them, it is hypothesized that they can more successfully engage in social interactions.

An increasing body of literature has shown that social stories are an effective way to teach individuals diagnosed with autism appropriate social behavior and norms, as summarized through a search in PubMed, MedLine, Web of Science, Scopus, Ebsco, PsychInfo, PsychArticles, Proquest Dissertations and Theses and ERIC databases, as summarized in Tables 1–3.

Social stories are based on the strengths of children with autism because they are visual, situation-specific, offer explicit information and tend to have short learning intervals with immediate effects (e.g., Andrews 2004; Gray 1994; Smith 2001). Social stories are an inexpensive treatment that can be applied to a wide variety of situations.

Originally, Gray and Garand (1993) suggested the stories include (a) descriptive, (b) perspective, and (c) directive sentences. Descriptive sentences explain when a specific situation occurs, where an event is taking place, who is participating, what will happen, or why the person should behave in a certain way. Perspective sentences describe someone else's thoughts, feelings, motivations, or beliefs in a particular circumstance. Directive sentences direct the actions of the person with Autism Spectrum Disorder (ASD) who is reading the story. Gray (1995, 1998, 2000) added more sentences including: (a) control, (b) affirmative, (c) cooperative and (d) partial sentences. To date, most of the social story literature used Gray's (1995) "basic" ratio that includes 1 directive and/or control sentence for every 3–5 descriptive and/or perspective sentences (Adams et al. 2004; Agosta et al. 2004; Bäckman and Pilebro 1999; Barry and Burlew 2004; Brownell 2002; Cullain 2000; Feinberg 2001; Gray and Garand 1993; Hagiwara 1998; Hagiwara and Myles 1999; Ivey et al. 2004; Kuttler et al. 1998; Lorimer et al. 2002; Moore 2004; Norris and Dattilo 1999; Pettigrew 1998; Rogers and Myles 2001; Romano 2002; Rowe 1999; Scattone 2002; Scattone et al. 2002; Staley 2001; Swaggart et al. 1995; Thiemann and Goldstein 2001). Although Gray (2000) and Gray and Leigh White (2002) continues to endorse the use of a growing number of types of sentences in social stories, research has not yet examined which ratio of different sentence types is most effective. The present study compared a directive story with a standard story to determine whether children with autism actually need to read more than directive sentences in order to benefit from a social story.

The current study replicated a previous study by Feinberg (2001). Feinberg's (2001) study included 34 children (25 males and 9 females) diagnosed with autism between

the ages of 8 and 13 years with at least phrase speech. Participants in Feinberg's (2001) study had a mean Verbal IQ of 71 (Standard Deviation of 24), based on the Wechsler Intelligence Scales for Children-Third Edition (WISC-III); participants' reading abilities were not directly assessed. Feinberg (2001) used nine games; only three of the nine games were specified (*Go Fish*, *Connect 4*, *Hi Ho Cheerio*). Results demonstrated that the children diagnosed with autism who received the experimental intervention steadily improved on the targeted social skills. Results also indicated that verbal intelligence (as measured by the Wechsler Intelligence Scale for Children-Third Edition [WISC-III]), severity of autism (as measured by the Autism Diagnostic Observation Schedule-Generic [ADOS-G]), and receptive language skills (as measured by the Peabody Picture Vocabulary Test-III [PPVT]) predicted the extent to which the children diagnosed with autism were able to improve social skills.

The purpose of the current study was to (a) attempt to replicate Feinberg's (2001) research demonstrating that a single social story intervention can effectively improve specific game play skills for a large cohort of children diagnosed with autism, (b) compare different formats of a social story, in order to help determine which components of a social story are most effective, (c) assess whether or not children diagnosed with autism can generalize and maintain skills they acquire from a social story intervention and (d) determine which prerequisite skills are required for a child with autism to benefit from a social story intervention.

## Methods

Forty-two children diagnosed with autism and three children diagnosed with ASD ages 7–14 participated in this study. They were recruited through several agencies in San Diego that provide services to families who have children with autism. Children were assessed using the Autism Diagnostic Observation Schedule (Lord et al. 1999), the Wechsler Intelligence Scale for Children—Fourth Edition (Wechsler 2003) and, in order to be eligible to participate, had to have at least a first grade reading level on the Reading Recognition and Reading Comprehension subtests of the Peabody Individual Achievement Test-Revised (PIAT-R; Markwardt 1989). Three children who were considered for the study were ineligible to participate because they did not have sufficient reading skills (i.e., less than a first grade level). This study utilized a "hybrid" design, since a pretest posttest repeated measures randomized control group design was implemented, and the participants in the control group were randomly assigned to

**Table 1** Overview of social story literature with single-case experimental designs

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Adams et al. (2004)	1	7	ASD	Not specified	Descriptive Directive Perspective Cooperative	Case study with reversal design	Crying, falling, hitting, and screaming	Verbal cueing	+
Agosta et al. (2004)	1	6	Autism	Not specified	Descriptive Directive Perspective	Case study with reversal design	Screaming, yelling, crying, or loud humming	Mayer–Johnson picture symbols, reinforcement system	+
Bäckman and Pilebro (1999)	1	9	Asperger syndrome	Average IQ	Descriptive Directive Perspective	Case study based on anecdotal data	Staying calm while the dentist removes two teeth	None	+
Barry and Burlew (2004)	2	7, 8	Autism	Not specified	Descriptive Directive Perspective Control	Multiple baseline across participants	Choice-making, appropriate play in classroom, how to play with a peer	Photographs, corrective feedback, prompting, typically developing children served as models, teacher-led instructional phase	+
Bernad-Ripoll (2007)	1	9	Asperger syndrome	FSIQ in superior range	Descriptive Perspective Directive Cooperative Affirmative	Case study based on objective data	Recognizing and understanding emotions	Photographs, videotapes, reinforcers	+
Bledsoe et al. (2003)	1	13	Asperger syndrome & ADHD	FSIQ = 82	Descriptive Directive Perspective	Case study with reversal design	Use of a social story intervention to improve mealtime skills of an adolescent with Asperger syndrome	Photographs	+
Briody and McGarry (2005)	2	2, 4	Typically developing	Not specified	Descriptive Directive Perspective Affirmative	Case study based on anecdotal data	Transition from home to pre-school	Photographs	+
Brownell (2002)	4	6–9	Autism	Not specified	(Musical story) Descriptive Directive Perspective Control	Case study with reversal design	“TV talk”, following directions, using a quiet voice	Mayer–Johnson picture symbols, verbal prompting, musical (song) format	+
Bucholz (2007)	3	26, 48, 57	2 = Mental Retardation, 1 = Down Syndrome	FSIQ < 59, FSIQ = 29, FSIQ = 30	Descriptive Directive Affirmative	Multiple Baseline across participants & uncontrolled case study for third participant	Peer interaction, work engagement, requests, Returning to work	Photographs	±

Table 1 continued

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Burke et al. (2004)	4	2–7	Typically developing (Clinically significant disruptive bedtime behavior)	Not specified	Not specified	Multiple baseline across participants	Disruptive bedtime behavior and frequent night waking	Reinforcement system	+
Chapman and Trowbridge (2000)	1	14	ASD	Not specified	Descriptive Directive	Case study based on anecdotal data	Decreasing anxiety during a novel activity	Picture Symbols	+
Crozier and Tincani (2005)	1	8	Autism	Not specified	Descriptive Perspective Directive	Case study with reversal design	Talking disruptively during classroom activities	Comparison between SS with and without prompting (ABAC design)	+
Crozier and Tincani (2007)	3	3, 3, 5	ASD	(1) DAS GCA in 13th percentile, (2) Not specified, (3) Not specified	Descriptive Directive Perspective	Case study with reversal design	Sitting appropriately, talking with peers, appropriate play with peers	Verbal prompting, Mayer–Johnson picture symbols	±
Cullain (2000)	5	4–8	Autism	Not specified	Descriptive Directive Perspective Control	Case study with reversal design	Reducing inappropriate communication, aggression, and inappropriate socialization	None	+
Daneshvar (2006)	4	5–10	Autism	Not specified	Descriptive Directive Perspective Affirmative	Alternating treatments design (Social stories vs. Steps to social success)/ multiple baseline across child	Greeting, turn taking, social commenting, social initiation	Verbal prompting, photographs were solely used in the steps to social success intervention	+ For Steps to Social Success, – for Social Stories
Delano and Snell (2006)	3	6, 6, 9	Autism	Not specified	Descriptive Directive Perspective Affirmative	Multiple baseline across participants	Seeking attention, initiating comments, initiating requests, making contingent responses with typical peers	Comprehension questions, token economy, peer training	±
Demiri (2004)	5	5–7	1 Autism 4 PDD-NOS	Mean = 85, Range = 72–95	Descriptive Directive Perspective Affirmative	Multiple baseline	Behavioral excesses/deficits	–	±
Dentato (2006)	1	12	ASD	Not specified	Descriptive Directive Perspective Affirmative	Case study based on objective data	Decreasing disruptive behaviors & improving appropriate communication skills	Role playing	±

**Table 1** continued

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Dodd et al. (2007)	2	9, 12	PDD-NOS	(1) Not specified (2) WISC-III, FSIQ = 107	Descriptive Directive Perspective Affirmative	Multiple baseline across behaviors/ participants	Decreasing excessive “directions” to others, & increasing use of compliments	Photographs, illustrations	+
Gray and Garand (1993)	4	6, 7, 9, 16	Autism	Not specified	Descriptive Directive Perspective	Case study based on anecdotal data	Improving adjustment to new routines, decreasing aggression, improving singing	Verbal prompting	+
Graetz (2003)	5	Avg. 12.6	Autism	WISC-III/WJ-III (1) FSIQ = 42, (2) FSIQ = 61, (3) FSIQ = 44, (4) AE = 2–6, (5) AE = 2–0	Descriptive Directive Perspective	Multiple baseline	Inappropriate social behavior	Photographs, Mayer–Johnson picture symbols	±
Haggerty et al. (2005)	1	6	Dyslexia	Average range (WPPSI)	Descriptive Directive Perspective Affirmative	Case study based on objective data	Reducing tantrum behaviors	Photographs/illustrations/“Apron Storytelling Technique” used (role play) in which child wore an apron with puppets with the child’s photograph	+
Hagiwara and Myles (1999)	3	7, 9, 7	Autism	Not specified	Descriptive Directive Perspective Control	Multiple baseline across settings	Washing hands, on-task behavior	Video self-modeling, presented on computer	±
Hutchins and Prelock (2006)	2	6, 12	ASD	Not specified	Descriptive Directive Perspective Control	Case study based on objective data	Getting along with sibling, insisting others continue with an activity	Comic strip conversations	±
Ivey et al. (2004)	3	5, 7, 7	PDD-NOS	(1) FSIQ = 92 (WPPSI-III), (2) Not specified, (3) Not specified	Descriptive Directive Perspective	Case study with reversal design	4 types of novel events: (1) setting changes, (2) novel toys presented by unfamiliar person, (3) purchases, (4) novel activities	Photographs illustrations verbal prompting & gestural prompting behavior modeling	+
Keyworth (2004)	3	7–12	Autism	Not specified	Descriptive Directive Perspective Affirmative Partial	Case study with reversal design	Social interactions with classmates	Photographs, Mayer–Johnson pictures	±

Table 1 continued

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Kuoeh and Mirenda (2003)	3	3, 5, 6	2 Autism 1 PDD-NOS	Not specified	Descriptive Directive Perspective Control Affirmative Cooperative	Case study with reversal design	Aggression, tantrumming when sharing, eating problems, tantrumming, touching genitals inappropriately, game-playing	Cartoon pictures, verbal prompting, verbal corrective feedback	+
Kuttler et al. (1998)	1	12	Autism, Fragile X, & intermittent explosive disorder	Cognitive skills estimated to be at a 5 year level	Descriptive Directive Perspective	Case study with reversal design	Reducing precursor to tantrum behavior	Mayer–Johnson pictures, token economy	+
Lorimer et al. (2002)	1	5	Autism	Estimated to have above average cognitive ability	Descriptive Directive Perspective Control	Case study with reversal design	Reducing precursor to tantrum behavior	Mayer–Johnson pictures	+
Marr et al. (2007)	4	4–5	Autism	Not specified	Descriptive Directive Perspective «Sensory Stories»	Case study with reversal design	Remaining in assigned seat	Illustrations	±
Moore (2004)	1	4	ASD	Not specified	Descriptive Directive Perspective Control	Case study based on anecdotal data	Disruptive bedtime behavior	Photographs, Praise, token economy	+
Norris and Dattilo (1999)	1	8	Autism	Average IQ	Descriptive Directive Perspective Control	Case study based on objective data	Reduce inappropriate social behaviors (i.e. talking or singing to herself) & increasing appropriate alternative behaviors	Picture symbols, behavior management systems	±
Okada et al. (2008)	3	11–13	(1) Autism (2) Autism (3) ADHD	(1) Moderate MR, (2) Moderate MR, (3) Tanaka-Binet FSIQ = 68	Descriptive Directive* Perspective (assessed social stories with and without perspective sentences)	Case study with reversal design	Reducing disruptive behaviors, improving hand-washing behaviors	Picture symbols, photographs	+ For social stories ± for the effect of perspective sentences

Table 1 continued

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Ozdemir (2008)	3	7–9	Autism	WISC-III (1) FSIQ = 62, (2) FSIQ = 86, (3) FSIQ = 74	Descriptive Directive Perspective	Multiple baseline across subjects	Disruptive behaviors (using a loud voice, chair tipping, cutting in line at lunch)	Illustrations of stick figures with “call outs” (e.g., picture of the teacher saying “Great job!”)	+
Pasiali (2004)	3	Children	Autism	Not specified	Descriptive Directive Perspective	Case study with reversal design	Decreasing inappropriate behaviors	Musical (song) format, picture schedule	±
Quilty (2007)	3	6, 10, 10	Autism	Not specified	Descriptive Perspective Directive Affirmative	Multiple baseline across participants	Decreasing disruptive behaviors	Photographs	+
Reynout and Carter (2007)	1	8	ASD	Not specified	Descriptive Directive Perspective	Case study based on objective data	Decreasing disruptive “tapping” behavior	Verbal prompting, photographs, comprehension questions	±
Ricciardelli (2006)	6	8–11	Autism	WISC-III Range = 80–109	Descriptive Directive Directive Partial	Case study based on objective data	Attending during class, asking for help, introducing self, initiating conversation, accepting compliments	Photographs	±
Rogers and Myles (2001)	1	14	Asperger syndrome	Not specified	Descriptive Directive Perspective Control	Case study based on objective data	Transitioning at school from lunch to P.E. class	Comic strip conversations, verbal prompting	+
Rowe (1999)	1	7	Asperger syndrome	Not specified	Descriptive Directive Perspective	Case study based on anecdotal data	Eating lunch appropriately at school	None	+
Salazar (2004)	3	4	Autism	Not specified	Descriptive Directive Perspective	Multiple baseline across behaviors	Improve specific social communication skills with peers	Pictorial cues, role Play	+
Sansosti and Powell-Smith (2006)	3	9, 10, 11	Asperger syndrome	(1) WPPSI FSIQ = 120, (2) SB-IV = 94, (3) RIAS = 84, (4) “Low Average IQ”	Descriptive Perspective Directive	Multiple baseline across participants	Sportsmanship, maintaining conversation, joining in	Mayer–Johnson pictures, journal feedback from participants & parents	±

Table 1 continued

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Scattone (2008)	1	9	Asperger syndrome	Kaufman brief FSIQ = 109	Descriptive Perspective Directive	Multiple baseline across behaviors	Eye contact, smiling, conversation initiation	Comprehension Questions, watching a videotape of adults modeling the targeted skills	PND Effect Sizes: + Eye Contact ( $d = .9$ ) & +Initiation ( $d = .8$ )–Smiling ( $d = .4$ )
Scattone et al. (2002)	3	7, 7, 15	Autism	(1) FSIQ = 44, (2) FSIQ = 82, (3) FSIQ = 67	Descriptive Perspective Directive	Multiple baseline across participants	Decreasing disruptive behaviors of children diagnosed with autism using social stories	Comprehension questions, verbal prompting	+
Scattone et al. (2006)	3	8, 8, 13	2 Autism 1 Asperger syndrome	(1) FSIQ = 67, (2) FSIQ = 97, (3) FSIQ = 95	Descriptive Directive Perspective	Multiple baseline across participants	Increase appropriate social interactions	Comprehension questions, verbal prompting	±
Schenk-Kornberg (2007)	3	12–14	Autism	Not specified	Descriptive Perspective Directive Affirmative	Case study based on objective data	Requesting a break, responding to teasing, accepting mistakes	Mayer–Johnson pictures, photographs	±
Soenksen and Alper (2006)	1	5	Hyperlexia	Not specified	Descriptive Perspective Directive	Multiple baseline across settings	Appropriately getting the attention of peers	Mayer–Johnson Pictures, Verbal Prompting	+
Simpson (1993)	1	11	ASD	Not specified	Descriptive Perspective Directive	Case study based on Anecdotal data	Classroom behavior	Feedback & reinforcement	+
Smith (2001)	19	6–14	15 ASD 2 LD 1 Tourettes 1 semantic/pragmatic difficulties	Not specified	Descriptive Perspective Directive Control Cooperative Partial	Case study based on Anecdotal data	Evaluating social stories across a range of home and school settings	Verbal prompting	+
Staley (2001)	5	12–14	2 Down syndrome 1 Fragile × 1 PDD-NOS 1 Autism	Not specified	Descriptive Directive Perspective Control	Multiple baseline across treatment	Increase chewing with mouth closed & napkin use during lunch	Response Cost (with edible reinforcer), Comprehension Questions* did not demonstrate story comprehension based on questionnaire	– For social story + for response cost
Swaggart et al. (1995)	3	11, 7, 7	2 Autism 1 PDD-NOS	Not specified	Descriptive Directive Perspective Control	Case study based on objective data	Greeting, reducing aggression, sharing toys	Illustrations, response cost, prompting	+



**Table 1** continued

Author	N	Age	Diagnosis	IQ	Sentences	Design	Target behavior	Other interventions	Result
Swaine (2004)	2	(11)	11	PDD-NOS (typically developing)	(1) Leiter-R FSIQ = 77, (2) Leiter-R FSIQ = 105	Descriptive Directive Perspective	Case study with reversal design	Initiating, commenting & requesting with peers	Role-playing
±									
Thiemann and Goldstein (2001)	5	11, 7, 8, 6, 12	1 Language impaired, 4 with autism	Not specified	Descriptive Directive Perspective	Multiple baseline across communication skills	Getting others' attention, initiating comments, initiating requests, contingent responses	Self-evaluation, video feedback, comic strip conversations	+
Toplis and Hadwin (2006)	5	Mean	age = 7	Typically developing	Not specified	Descriptive Perspective Directive Affirmative	Case study with reversal design	Decreasing disruptive behavior during lunch at school	Illustrations, picture icons, verbal/physical prompting
±									
Travis (2006)	3	3–4	ASD	Not specified	Descriptive Directive Perspective Affirmative	Case study based on objective data	Appropriate play, disruptive behaviors, seeking help, requesting, remaining in proximity	Photographs, musical (song) format	±
Washburn (2006)	4	12–14	Asperger syndrome	WISC-IV "Normal IQ"	Descriptive Directive Perspective Affirmative	Case study with multiple baseline across participants	Increasing turn taking and decreasing interrupting in conversations	Visual prompts	+
Wheeler (2005)	2	8, 9	Autism	Psychoeducational Profile Revised (PEP-R) (1) 3-year, 2-month cognitive level, (2) 3-year, 1-month cognitive level	Descriptive Directive Perspective Affirmative	Case study based on objective data	Independent initiation to complete class assignments, completing tasks without engaging in disruptive behaviors	Mayer–Johnson picture symbols, prompting, token economy (written into the social story as well as a "First, Then" card illustrating how many tasks he needed to complete before receiving reinforcement)	+

*Note:* Studies that demonstrated positive results through the use of a social story intervention are denoted with a "+" sign, studies that failed to demonstrate significant results are denoted with a "–", studies with mixed results are denoted with "±"

**Table 2** Overview of social story literature with group designs

Author	<i>N</i>	Age	Diagnosis	FSIQ	Sentences	Design	Target behavior	Other interventions	Results
Andrews (2004)	20	8–12	Autism	WISC-IV Control group: <i>M</i> = 59.10, Range = 44–84, Expt. Group: <i>M</i> = 70.40, Range = 49–84	Directive Descriptive Perspective Affirmative	Pretest–posttest repeated measures control group design	Initiation of game play, enjoyment in game play, turn taking, continued desire	None	+
Bader (2006)	20	6–13	Autism	WISC-IV <i>M</i> = 96.5, <i>SD</i> = 12.4, Range = 82–129	Directive Descriptive Perspective Affirmative	Pretest–posttest repeated measures control group design	Emotion recognition & emotion labeling	Illustrations, computer tasks	+
Feinberg (2001)	34	8–13	Autism	WISC-III Verbal IQ <i>M</i> = 71.67	Descriptive Directive Perspective Control	Pretest–posttest repeated measures control group design	Greeting behaviors, requesting to play a game, asking what another person wants to play, accepting another person's suggestion for a game	None	+
Kalyva and Agaliotis (2008)	63	10–12	Learning disabilities	WISC-III > 80  <i>M</i> = 96, Range = 85–111	Not specified	Pretest–posttest control group design	Interpersonal conflict resolution strategies	Questions about social interaction & interpersonal conflict resolution strategies	+
Pettigrew (1998)	69	3–4	Specific language impairments	<i>M</i> = 96, Range = 85–111	Descriptive Directive Perspective Control	Pretest–posttest control group design	Asking to play & sharing a toy	Scaffolded activities, photographs	+
Romano (2002)	10	4–8	Autism	Not specified	Descriptive Directive Perspective Control	Pretest–posttest control group design	Inappropriate communication, aggression, inappropriate socialization	Photographs	+

**Table 3** Reviews of social stories

Author	Type of Review
Ali and Fredrickson (2006)	Investigating the evidence base of social stories
Attwood (2000)	Strategies for improving the social integration of children with Asperger Syndrome
Carbo (2005)	How professionals create and implement social story interventions for children with autism spectrum disorders
Crozier and Sileo (2005)	Encouraging positive behavior with social stories: An intervention for children with Autism Spectrum Disorders
Del Valle et al. (2001)	Uses of social stories
Greenway (2000)	Strategies to promote prosocial behaviors
Gut and Safran (2002)	Strategies to improve social skills for classroom inclusion
Hess et al. (2008)	Autism Treatment Survey: Services received by children with autism spectrum disorders in public school classrooms in Georgia
Howell (2005)	Teacher's perspectives on using social stories and comic strip conversations for individuals with ASD in classroom settings
More (2008)	Practical suggestions for how to create digital social stories
Myles and Simpson (2001)	Practical suggestions for helping children with ASD understand the "hidden curriculum" of social skills
Nichols (2005)	Review of Social Story Interventions
Reynout and Carter (2006)	Review and meta-analysis of Social Story Literature
Rust and Smith (2006)	How to evaluate the effectiveness of Social Stories in modifying the behavior of children with ASD
Sansosti et al. (2004)	Research Synthesis of Social Story Interventions for Children with ASD
Scattone (2007)	Social skills interventions for children with autism
Scattone and Knightt (2006)	Current trends in behavioral interventions for children with autism
Simpson and Myles (1998)	Strategies for the prevention of and response to aggression specific to Asperger Syndrome
Tarnai and Wolfe (2008)	Social stories for sexuality education for persons with Autism/Pervasive Developmental Disorder
Zimelman et al. (2007)	Addressing physical inactivity among developmentally disabled students through visual schedules and social stories

receive either the standard or directive story conditions on the second intervention day.

The first independent variable, the storytelling condition, was the between-subjects independent variable with three levels: (a) standard condition (experimental manipulation), (b) directive condition (experimental manipulation), and the (c) control story condition consisting of a story unrelated to social skills. Feinberg (2001) created the story written in the standard format used in this study (see [Appendix A](#)). The directive version of Feinberg's (2001) story used the directive sentences from the original story verbatim (see [Appendix B](#)). Feinberg (2001) created the social story with feedback from three educators and professors who had experience in creating social stories, including the original developer of social stories, Carol Gray. Thus, it was agreed upon that the contents of the social story clearly focused on the four targeted game play skills and that the story adhered to Gray's (1993, 1998) social story ratio (Feinberg 2001, p. 31). The control story is presented in [Appendix C](#).

The second independent variable, time, was the within-subjects independent variable. Time had 5 levels for each

of the two intervention days; the baseline (Trial 1) and four trials (Trials 2–5) were completed in one day.

The final trial on each day was considered the "generalization" trial because the game set in the Play Room was switched; six different turn-taking games for two players were placed on the table for each trial. Game Set #1 included (1) *Uno*, (2) *Hungry Hippos*, (3) *Tic Tac Toe*, (4) *Chess/Checkers*, (5) *Hi Ho Cheerio*, and (6) *Memory*. Game Set #2 included (1) *Go Fish*, (2) *Connect 4*, (3) *Battling Tops*, (4) *Jenga*, (5) *Guess Who?* and (6) *Chutes & Ladders*. The length of time it took to complete each game varied; for instance, the game Tic Tac Toe may have taken approximately 2 min to play, whereas Candyland may have taken 10 min or longer depending on the types of cards drawn by the players. Some games required players to converse with one another (e.g., during "Guess Who?"—players asked one another various questions to determine which character they had) whereas other games could be played in silence by using non-verbal gestures (e.g., during Jenga players took turns taking blocks out of a tower while simultaneously trying to keep the tower standing).

Participants in both the experimental and control groups returned for a second training session 1 week after their first training session, in order to assess whether children in the experimental group maintained their social skills after 1 week, and whether children in the control group would significantly improve their social skills after receiving the intervention.

This study's dependent variable, social skills, consisted of a participant's total social skills score. This score was comprised of the sum of the four individual behavioral scores (as coded by independent raters) received during each trial. The operationally defined play skills included (a) greeting behaviors, (b) requesting to play a game, (c) asking another person what they want to play, and (d) accepting another's choice of game. All social skills were rated on a 0–2 scale. The participants had the possibility of earning a total score from 0, if he or she was unable to complete any of the social behaviors, to 8, if he or she performed all of the social behaviors correctly. Data was analyzed through repeated measures ANOVA with time and condition as the independent variables, and total game playing skills score as the dependent variable.

The first skill was greeting behavior. When no effort was made to communicate verbally or nonverbally, a score of 0 was given. If a child offered a nonverbal greeting (e.g. eye contact or waving his/her hand), s/he was scored 1 point. A score of 2 was given for a clear attempt to verbally greet the examiner, such as saying "Hi."

The second skill was requesting to play a game. If a child made no effort to request to play with the examiner, s/he was given a score of 0. A child who made a nonverbal attempt to request game-play, or a child who made a comment about the games without looking at the examiner, was given a score of 1. A score of 2 was given when a child made a verbal request to the examiner to play a game.

The third social skill was asking another person what they want to play. If a child made no attempt to ask the examiner what they want to play or indicate that it was the examiner's turn to pick a game, a score of 0 was given. If a child nonverbally attempted to ask the examiner, such as bringing a game to the examiner, s/he was given a score of 1. A score of 2 was given when a child verbally asked the examiner what game they want to play, or by saying "your turn."

The fourth social skill was accepting the examiner's choice of game to play. If no attempt was made to accept the examiner's choice of game, a score of 0 was given. If the participant accepted the examiner's choice nonverbally, s/he was given a score of 1. A clear attempt to accept the examiner's choice in conjunction with appropriate verbal language, such as "Yes, let's play that game together" was given a score of 2. The dependent variables are operationally defined in [Appendix D](#).

The coding of the game play skills was completed by three independent raters (a trained undergraduate and two trained graduate students) unfamiliar with the hypotheses of the study; the raters were blind to the type of intervention that the children received. Raters were, however, given videotapes that presented game play sessions in the temporal sequence in which they occurred (i.e., first trial, then second trial and so forth). Prior to assessing game play improvement, interrater reliability was assessed to ensure that the three raters who scored videotapes of play sessions were consistent in their scoring. Interrater reliability was assessed using intraclass coefficients to make comparisons between (a) raters 1 and 2, (b) raters 1 and 3, and (c) raters 2 and 3 for the play skill score for participants at Day 1, and the play skill score at Day 2.

### Procedures

Participants in the Standard group received the story in the standard format on both days, and participants in the Directive group received the directive story on both days. Participants in the Control group received the control story on the first day, and were randomly assigned to either the standard or directive story on the second day.

Two rooms with bare walls were utilized during the intervention that included a table and chairs. The first room, also known as the "Reading Room," was used for reading the story. The second room, called the "Play Room," was used to assess behavioral improvements. The participant sat at a table across from an adult research assistant. One set of games (including six different games) were placed on the side of the table, within reach of the child. The research assistant waited 1 min without prompting the participant. After 1 min, the research assistant said "Hello" to the child. The research assistant waited 1 min to offer the child a chance to respond. If the child did not initiate conversation or play a game during these 2 min, the research assistant led the child to the Reading Room.

If the child initiated conversation, the research assistant responded with conversation. If the child initiated game play, the research assistant played with the child. After the game was over, the research assistant waited for 1 min. If the child reinitiated game play, the research assistant played with the child. A maximum of 3 games were played during each play session. Each participant was led to the Play Room for play sessions with a research assistant a total of 5 times on each day, and was led to the Reading Room to read his/her assigned story with the primary investigator a total of 4 times on each day. Prior to the fifth, and final, play session on each intervention day, the research assistant in the "Play Room" switched the game set for the generalization trial.

Participants were asked to return 1 week later. The first play session was considered the "Return to Baseline

Phase,” and served as a measure of maintenance of game play skills. The procedures on the second day were identical to the procedures from the first day. The one exception to this was for the participants in the control group, who were randomly assigned to receive either the standard or directive social story intervention on the second day rather than the control story.

**Results**

There was a wide range of intellectual abilities represented. A finding of great importance appears to be that one third (15 of the 45 participants) did not improve game play skills, and that Verbal Comprehension Index scores made the strongest unique contribution in explaining game play skills.

It was hypothesized that children who were administered either the standard or directive social story intervention would demonstrate significant improvements in displaying, generalizing and maintaining game play skills compared to children with autism in a control condition who read a story unrelated to social skills. A series of ANOVAs were conducted to ensure that the standard, directive and control groups were equivalent based on (a) age, (b) Full Scale IQ, (c) Verbal Comprehension Index (VCI), (d) Perceptual Reasoning Index (PRI) (e) PIAT Reading Recognition (grade level), (f) PIAT Reading Comprehension (grade level), and (g) Autism Diagnostic Observation Schedule – Communication + Social Interaction Score (see Table 4).

No significant differences between the (1) standard, (2) directive and (3) control groups were found in terms of Age,  $F(2,42) = 1.86, p > .05$ , Full Scale IQ,  $F(2,42) = .388, p > .05$ , Verbal Comprehension Index from the WISC-IV,  $F(2,42) = .063, p > .05$ , Perceptual Reasoning Index from the WISC-IV,  $F(2,42) = 1.21, p > .05$ , PIAT Reading Recognition (RR),  $F(2,42) = 1.31, p > .05$ , PIAT Reading Comprehension (RC),  $F(2,42) = .407, p > .05$ , and ADOS

score,  $F(2,42) = .257, p > .05$ . Furthermore, 42 of the participants in this study were male and 3 were female; each of the three treatment groups included one female. Of note, although there were not significant group differences in terms of reading ability, participants’ reading comprehension and reading recognition abilities, based on the PIAT-R, varied between the 1st and 12th grade levels (see Table 4 for details).

A 3 (condition) × 4 (trial) repeated measures ANOVA with time and condition as the independent variables, and total game playing skills score operationally defined by Feinberg (2001) as the dependent variable was conducted. Only observational data from day 1 trials were used in these analyses, since the control group received the experimental intervention on Day 2. Furthermore, only four trials were included in the analysis because the fifth trial was the generalization trial (in which the game set was switched).

There was a significant main effect for Condition,  $F(2,42) = 4.31, p < .05$ . Children who received either the standard or directive social story intervention showed significantly higher game play skill scores than the children who received the control story. The analysis of variance of game play skills also showed a significant main effect for Trial,  $F(6,118) = 14.98, p < .001$ . Results indicated a significant Condition × Trial interaction,  $F(6,118) = 4.71, p < .001$ . Thus, children who received social story training (either the standard or directive story format) showed significant game play skill improvements across four trials while children who received the control story did not improve. The observed power was equivalent to .982, effect size  $\eta^2 = .18$ . The means and standard deviations for game play skills from the control, standard and directive social story groups are presented in Table 5.

It was hypothesized that children who received either the standard or directive social story interventions would be able to generalize their newly acquired skills with new materials (games). All participants were randomly assigned to play with one game set for trials 1–4 and trials 6–9; the

**Table 4** Equivalence between the standard, directive and control story groups

Group	Data	Age	FSIQ	VCI	PRI	RR	RC	ADOS
Standard (n = 15)	<i>M</i>	9.49	86.20	82.07	99.47	4.09	3.82	15.00
	<i>SD</i>	(2.09)	(22.80)	(28.04)	(13.83)	(3.55)	(3.72)	(4.99)
	Range	7–12	53–120	47–124	73–119	1.1–12.5	1.0–12.9	7.0–23.0
Directive (n = 15)	<i>M</i>	10.33	81.00	79.33	95.20	3.66	3.81	14.40
	<i>SD</i>	(2.53)	(20.26)	(24.85)	(13.18)	(3.00)	(3.72)	(3.81)
	Range	7–14	49–110	45–116	71–112	1.2–12.9	1.2–12.9	7.0–20.0
Control (n = 15)	<i>M</i>	8.85	79.47	78.80	90.67	2.49	2.85	15.60
	<i>SD</i>	(1.59)	(22.68)	(27.86)	(18.89)	(1.41)	(2.50)	(4.87)
	Range	7–12	42–122	45–124	57–129	1.0–4.7	1.0–10.0	9.0–24.0

**Table 5** Game play scores for the standard and directive groups across 10 trials

Group	Day 1					Day 2				
	Baseline	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
Standard ( <i>n</i> = 15)	1.87 (1.30)	4.53 (3.48)	4.53 (3.25)	4.07 (3.17)	3.67 (2.82)	4.53 (3.27)	5.20 (3.28)	5.07 (3.31)	5.07 (3.17)	4.80 (3.36)
Directive ( <i>n</i> = 15)	2.40 (1.18)	3.73 (2.96)	4.87 (2.90)	5.07 (2.84)	4.33 (2.66)	3.93 (1.94)	4.93 (3.13)	4.93 (2.99)	5.80 (2.57)	5.20 (2.73)

Note: Values in parentheses represent standard deviations

participants were given the other game set to play with during trials 5 and 10 (the last trial on each intervention day). Based on a series of *t*-tests, no significant differences were found between the first four trials on each day, and the final trial on each day (in which the game sets were switched) for any of the three groups. Thus, participants were able to generalize their game play skills after receiving either the standard or directive social story intervention.

It was hypothesized that children in both the standard and directive groups would be able to demonstrate maintenance of game play skills during the return to baseline trial (Trial 6) on Day 2 (after receiving the experimental intervention on Day 1). A series of *t*-tests comparing Trial 5 and Trial 6 indicate that the game play skills of the Standard and Directive groups did not differ significantly between Trials 5 and 6. Thus, participants in the Standard and Directive groups were able to maintain their game play skills 1 week after receiving the experimental intervention.

It was hypothesized that children who read the directive story would improve their game play skills at a significantly faster rate than the children who read the standard story, since the directive story primes the reader by explicitly stating the expected behaviors without incorporating additional, and potentially confusing, background information. A 2 (condition)  $\times$  10 (trial) repeated measures ANOVA with condition and time as the independent variables, and total game play skills as the dependent variable was used to analyze this. There was no significant main effect of Condition,  $F(1,28) = .042$ ,  $p > .05$ . There was no significant Condition  $\times$  Trial interaction,  $F(7,200) = 1.18$ ,  $p > .05$ . Thus, the Standard and Directive groups did not differ from one another significantly. There was a significant main effect of Trial,  $F(7,200) = 11.14$ ,  $p < .001$ . Thus, children who received either the standard or directive social story intervention showed significant improvements across trials from both intervention days.

This study utilized a social story intervention written in two different formats to assess Game Play Skill improvements in children with autism. There was a wide range of intellectual abilities represented by the volunteers in this study. Based on observations of raw data prior to analysis,

it was evident that some participants with autism substantially improved their game play skills, while others failed to improve. In attempt to understand the differences in social story success among participants, correlations were conducted between the mean Game play Skill Score from all five trials on Day 2 and assessment data. Based on the correlations, Full Scale IQ, VCI, PIAT-Reading Recognition, PIAT-Reading Comprehension, ADOS and prior Game play Experience (based on questionnaire completed by parents) scores were significantly correlated with total Game play Scores. A standard multiple regression was conducted in order to determine which variable had the strongest relationship with social story success. Verbal Comprehension Index scores made the strongest unique contribution in explaining game play skills.

In order to investigate the effect that the Verbal Comprehension Index scores had on overall game play skills, a 3 (Condition)  $\times$  10 (Trial) mixed ANCOVA was conducted. There were three levels of the group independent variable, Standard, Directive and Control, and 10 levels of the time variable (across both intervention days). The covariate, VCI, was significant in the model,  $F(1,41) = 82.76$ ,  $p < .001$ ,  $\eta^2 = .669$ , and accounted for 66.9% of the variance in the dependent variable. Observed power was equivalent to 1.00. There was a significant Condition  $\times$  Trial interaction,  $F(7,271) = 2.55$ ,  $p < .01$ . The observed power was equivalent to .982 with an effect size  $\eta^2 = .11$ . Upon primary inspection of the raw data, it was evident that participants with autism who had VCI scores in the Borderline to Superior Range (69–124) were able to make significant improvements in their game play skills, while children who had VCI scores in the Extremely Low Range (45–61) were unable to make significant improvements. The 15 participants with Extremely Low VCI scores only added more variability to the results of the study, as indicated by their low total play skill scores. Thus, the following exploratory analysis will include only 30 participants with VCI scores above 68 in order assess whether or not the standard and directive groups significantly improved their game play skills compared to the control group. Even when the number of participants that were statistically analyzed was reduced, power remained sufficient.

**Table 6** Assessment data for 30 children diagnosed with ASD with a verbal IQ  $\geq 68$

Group	Data	Age	FSIQ	VCI	PRI	RR	RC	ADOS
Standard ( <i>n</i> = 10)	<i>M</i>	9.49	98.80	98.70	103.20	5.36	5.00	11.90
	<i>SD</i>	(2.04)	(16.25)	(17.32)	(14.64)	(3.76)	(4.10)	(2.42)
	Range	7–12	71–120	69–124	73–119	1.2–12.5	1.0–12.9	7–15
Directive ( <i>n</i> = 10)	<i>M</i>	9.72	91.70	93.50	100.90	4.29	4.68	12.60
	<i>SD</i>	(2.61)	(14.87)	(16.34)	(8.49)	(3.51)	(4.35)	(3.20)
	Range	7–14	69–110	73–116	90–112	1.2–12.9	1.2–12.9	7–19
Control ( <i>n</i> = 10)	<i>M</i>	8.79	91.50	95.10	97.80	2.96	3.66	13.20
	<i>SD</i>	(1.38)	(16.47)	(17.92)	(17.12)	(1.51)	(2.74)	(2.94)
	Range	7–11	68–122	71–124	82–129	1.0–4.7	1.2–10.0	9–20

**Table 7** Means and standard deviations of total play skills for participants with VCI scores above 68

Group	Day 1					Day 2				
	Baseline	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10
Standard ( <i>n</i> = 10)	2.50 (0.97)	6.30 (2.83)	6.40 (2.07)	5.90 (2.03)	5.30 (1.77)	6.50 (1.84)	7.20 (1.69)	7.10 (1.66)	7.00 (1.70)	6.80 (1.93)
Directive ( <i>n</i> = 10)	2.90 (0.88)	5.10 (2.60)	6.30 (2.45)	6.40 (2.27)	5.70 (2.06)	4.70 (1.95)	6.40 (2.63)	5.90 (2.64)	6.40 (1.78)	6.50 (2.27)
Control-Standard ( <i>n</i> = 5)	2.80 (0.84)	2.40 (1.14)	2.80 (1.30)	2.40 (1.67)	2.20 (1.48)	3.00 (0.71)	4.80 (3.03)	6.40 (2.19)	6.40 (2.19)	5.40 (1.95)
Control-Directive ( <i>n</i> = 5)	2.40 (0.89)	2.40 (1.14)	2.20 (0.84)	2.20 (0.84)	2.40 (1.14)	3.00 (1.00)	5.60 (1.82)	4.80 (2.17)	4.60 (2.30)	6.60 (1.67)

A series of ANOVAs were conducted to ensure that the standard, directive and control groups were equivalent based on (a) age, (b) Full Scale IQ, (c) Verbal Comprehension Index (VCI), (d) Perceptual Reasoning Index (PRI) (e) PIAT Reading Recognition (grade level), (f) PIAT Reading Comprehension (grade level), and (g) Autism Diagnostic Observation Schedule – Communication + Social Interaction Score (see Table 6).

No significant differences between the (a) standard, (b) directive and (c) control groups were found in terms of Age,  $F(2,27) = .542, p > .05$ , Full Scale IQ,  $F(2,27) = .686, p > .05$ , Verbal Comprehension Index from the WISC-IV,  $F(2,27) = .240, p > .05$ , Perceptual Reasoning Index from the WISC-IV,  $F(2,27) = .380, p > .05$ , PIAT Reading Recognition (RR),  $F(2,27) = 1.51, p > .05$ , PIAT Reading Comprehension (RC),  $F(2,27) = .340, p > .05$ , and ADOS score,  $F(2,27) = .513, p > .05$ . Two of the three female participants were included in these analyses since they had VCI scores above 68; one of the females was in the standard group and one was in the directive group.

A 3 (condition)  $\times$  4 (trial) repeated measures ANOVA with time and condition as the independent variables, and total game playing skills score as the dependent variable was conducted in order to analyze game play skill

improvements during the first four trials on Day 1. There was a significant main effect for Condition,  $F(2,27) = 14.15, p < .001$ . Children who received either the standard or directive social story intervention showed significantly higher game play skill scores than the children who received the control story. The analysis of variance of game play skills also showed a significant main effect for Trial,  $F(3,81) = 17.53, p < .001$ . Results indicated a significant Condition  $\times$  Trial interaction,  $F(3,81) = 5.90, p < .001$ . Thus, children who received social story training (either the standard or directive story format) showed significant game play skill improvements across five trials while children who received the control story did not improve. The observed power was equivalent to .997, effect size  $\eta^2 = .30$ . The means and standard deviations for game play skills from the control, standard and directive social story groups are presented in Table 7.

**Discussion**

Results of this study further suggest that individuals who have Extremely Low Verbal Comprehension skills (based on the WISC-IV) may not benefit from social story



interventions that do not include pictures or other concomitant treatment strategies; this is an important consideration for treatment providers. Overall, this study demonstrated that a large cohort of children with ASD who had Verbal Comprehension skills (based on the WISC-IV) in the Borderline range or above significantly increased several valuable game play skills *immediately* after reading either a Standard or Directive social story.

To date, this study, including 45 participants diagnosed with ASD, incorporates more participants than any previously published social story intervention on children with autism. The analyses had sufficient power and effect sizes to draw conclusions from the data. A true experimental design was used; this study is one of only four studies in the literature that included the use of a control condition when implementing a social story intervention with children with ASD (Andrews 2004; Feinberg 2001; Romano 2002). The current investigation contributes additional empirical evidence demonstrating that a single social story can be useful for large cohorts of children with autism (Andrews 2004; Feinberg 2001), which shows that social story interventions can be efficient and cost effective. Furthermore, this social story intervention programmed for generalization (with different games) and maintenance (for 1 week) of the targeted skills, which is considered “best practice” for educating children with autism (Sansosti et al. 2004). The current study was the first to compare different social story formats, and determined that Standard and Directive story formats can be equally effective in eliciting game play skills. This is a significant contribution to the literature because it may change the way treatment providers use social stories to prime the behavior of individuals with autism.

The rapid increase in the number of individuals diagnosed with autism in recent years has compelled researchers and treatment-providers to create more cost-effective solutions in order to improve the quality of life of afflicted individuals. Social stories are a valuable intervention because they are portable, easy to implement with inexpensive materials, tend to have short learning intervals with immediate effects, can be written about virtually any situation or behavior that a child has difficulty with, and can be used for large groups (rather than being specifically tailored for individuals).

Children with autism vary in terms of their intelligence, autism severity, reading ability and adaptive skills, yet research indicates that a wide range of children with autism may benefit from social story interventions. It is likely that the success of a social story intervention is dependent on a variety of factors, such as the targeted behaviors, required reading level, and the motivation of the child. For instance, results of the current study demonstrated that in order for the social story to improve game play skills, children with

ASD needed to have prerequisite skills including a first-grade reading level (based on the PIAT-R), a Verbal IQ composite score (based on the WISC-IV) of at least 69, and prior experience playing board games. Social story interventions that target other types of skills may not require a VCI score of at least 69, or prior experience with the targeted behavior. Although the children in the present study with Extremely Low VCI scores had at least a 1st grade reading comprehension level, it is likely that the social story presented to them included concepts that they were unfamiliar with (e.g., turn taking) or too abstract (e.g., asking someone what game they wanted to play) for them to understand. For children with VCI scores in the Extremely Low range, future research may attempt to teach more basic skills that may be prerequisites for learning to play board games, such as learning readiness skills (e.g., imitation), turn taking skills during very basic games (e.g., rolling a ball back and forth), and explicit teaching (e.g., prompting and modeling to teach individuals how to play specific games). Furthermore, individuals with Extremely Low VCI scores may require concomitant strategies with social stories, such as illustrations, prompting, and/or reinforcement in order to increase their motivation and benefit from the intervention.

Studies have demonstrated that social stories have been useful for children with autism as young as 4 years (Cullain 2000; Moore 2004; Romano 2002; Salazar 2004) and as old as 16 years in age (Gray and Garand 1993). Interestingly, social stories have also been shown to be effective with typically developing children (Burke et al. 2004). Furthermore, a social story targeting the improvement of social skills was successfully implemented in a study with 69 children ages 3–4 that had specific language impairments (Pettigrew 1998) and in a study with 63 children ages 10–12 who had Learning Disabilities (Kalyva and Agaliotis 2008). Thus, research has demonstrated that social story interventions can be effective for a wide range of age levels and different types of children.

Social stories may be effective because children with autism tend to be visual learners who need social information to be described explicitly in order to act appropriately in a given context. A preponderance of evidence gathered from published social story research thus far indicates that social stories are beneficial in educating children with autism. Although many of these studies lack rigorous methodological standards, use a small number of participants, or use the social story intervention in conjunction with other treatments (making it difficult to convey the source of the behavioral change), only two studies published thus far concluded that social stories are not useful (Staley 2001; Daneshvar 2006). The results of Staley (2001) are questionable. Staley (2001) included one child with autism and four other children with different



types of developmental delays; it is unclear whether the participants possessed basic verbal comprehension skills necessary to understand the social story. Staley (2001) concluded that only edible reinforcers facilitated changes in behavior as opposed to a social story. However, he introduced edible reinforcers although none of the participants exhibited comprehension of the social stories (as demonstrated by their inability to answer basic comprehension questions). As validated in the current intervention, children who lack basic verbal comprehension skills may be unable to benefit from a social story intervention. Daneshvar (2006) compared “Steps to Social Success” (i.e., a photographic picture schedule), with a social story intervention and concluded that Steps to Social Success was effective, whereas social stories are not effective, in teaching social behaviors to four children with autism. However, three of the four participants in Daneshvar’s (2006) study had significant developmental impairments, with age equivalents on the Peabody Picture Vocabulary Test-Revised (PPVT-R) falling between the 1- to 3-year level. Thus, although the participants significantly benefited from explicit picture schedules, the social stories may not have been meaningful for them.

Based on results of the present study, the “active ingredient” in social stories seems to come from the directive sentences. The standard and directive stories were equally effective in eliciting improvements in game play, and the standard story included the same directive sentences as the directive format. Thus, the directive sentences may prime the story-reader to identify a specific context for when the prescribed behaviors should be applied. The participants in both the standard and directive groups demonstrated significant improvements in game play skills immediately after they read the social story. Furthermore, the children in the standard and directive groups continued to demonstrate appropriate game play skills across trials, and maintained their skills 1 week after receiving the intervention.

The social story intervention may have worked, in part, because of operant conditioning, because there seemed to be something reinforcing in the play sessions for the participants with ASD. Playing games may be a positive experience for children with autism because (a) games have clearly defined rules, (b) they are predictable, (c) the children get positive attention from another person, and (d) the children seemed to enjoy the chance to win games. This is supported by previous literature (Andrews 2004; Feinberg 2001) which reported that children with autism are able to improve their game play skills through a social story intervention.

The ability of the directive sentences in social stories to prime the behavior of children with autism in specific contexts corresponds with previous research by Thomson (1993) that describes the importance of providing cues as “conversational support” for children with autism

(Thomson 1993, p. 13). In Thomson’s study (1993), 24 children with autism ages 6–19 participated in one-on-one conversation sessions with an adult while making art collages. Participants were divided into three groups based on the level of “contextual support” from cues: (a) attention cues which called subjects’ attention prior to presentation of the comment, (b) response cues which provided information about how to respond to comments, and (c) a combination of attention and response cues (Thomson 1993, p. 20). Results demonstrated that the participants had difficulty conversing during baseline, but that when attention and/or response cues were offered, 19 out of 24 children significantly increased their ability to initiate and reciprocate appropriate comments (Thomson 1993). Thus, the findings illustrate the importance of facilitating the social interactions in children with autism by providing directive cues. In addition, the results indicate that although many children with autism “have an adequate response to simple comments within their repertoires,” they “do not regularly produce it in an interactive context” (Thomson 1993, p. 257). This is consistent with findings from the current study indicating that although children with autism may be knowledgeable about appropriate social skills, they have difficulty engaging in these behaviors without directives to make them aware of expected behaviors in specific contexts. Furthermore, Thomson (1993) reported that “autistic individuals have been reported to seek and stay with communication exchanges in which they experience success including ones with social ends” (Thomson 1993, p. 247). This is also consistent with findings from the current study, because once the children with autism participated successfully in game play, they continued to do so across trials.

Though the current study made several contributions to the literature, there were some limitations. The play sessions were unnatural; future research may assess whether children with autism are able to generalize play skills in more familiar settings and with peer play partners. Future research may also assess whether children with autism can maintain their game play skills over longer periods of time. Further research should investigate the effects of social stories on other types of social skills such as “being a good sport about losing a game,” “how to play fairly,” or “how to respond assertively when others cheat.” Participants with autism in this study seemed quite concerned about winning games, and sometimes cheated in order to raise their chances of winning. Perhaps future social stories can address information about being able to lose games without becoming angry or feeling rejected.

The results from this study indicated that (a) the standard and directive social story interventions were equally effective for children with ASD in terms of (a) eliciting game play skills, (b) generalizing game play skills with

different games, and (c) maintaining game play skills over a 1 week period. This study supports the use of social story interventions for children with autism ages 7–14 who have Verbal Comprehension Index (VCI) scores from the WISC-IV above 68.

It is important to note that all of the children who made improvements in play skills had prerequisite skills including Verbal Comprehension Index scores above 68 and prior game play experience. It is possible that the participants who had VCI scores below 68 and who lacked game play experience may have improved their play skills through the social story intervention if they had initially been offered training sessions to learn how to play the games. However, it is likely that game play requires “higher level” cognitive skills that children with severe autism or mental retardation lack, such as adequate executive functioning, processing speed, communication skills, attention and memory.

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### **Appendix A: Playing Games (Feinberg 2001) (Standard Social Story Format)**

#### Standard Story

When I go in a room it is important to say hi to the person in the room with me.

Sometimes this is someone I know like my teacher or my mom.

Sometimes it may be someone I don't know.

I can say “hello” or “hi” to them.

Usually they will say hi back to me.

It makes people happy when I say hi to them.

Sometimes there are toys that I can play with.

I may see a game that I like to play.

If I want to play a game with a person, I should ask them.

I can say, “Do you want to play with me?” or “Will you play this game with me?”

Sometimes the person will say yes but sometimes they may say no.

If they say yes I can open the game and have fun playing.

When I am finished playing my game, it makes other people happy if I ask, “What game do you want to play?”

This shows that I can share with other people.

I can also pick up the game and bring it over to the table. If they say yes I can open the game and have fun playing.

It is important to take turns.

Other people like it when I take turns and play nicely.

When I am finished playing my game it makes other people happy if I ask, “What game do you want to play?”

I can also say, “Your turn to pick a game.”

This shows that I can share with other people.

When they say the name of the game they want to play with me, I can say, “Yes, I will play with you.”

Sometimes I do not like the game the other person chooses but sharing turns makes other people feel good.

I like to play games with my friends.

I am happy and so are my friends that I play with.

### **Appendix B**

#### Max (Solely Used to Add Length to the Directive Story Format)

Max is a boy. He is 10 years old.

He has black hair and green eyes. He is very tall.

Max likes summer time, because he can do lots of things. He likes to go to the pool. It can be fun to go swimming. Max also likes going to the park. He can swing or go down the slide.

Sometimes he plays in the sand.

He also likes to ride his bike. Max likes to ride really fast.

Sometimes he takes his dog to the park.

His dog is named Bo.

Bo is brown with white ears. He is tall like Max.

When it is really hot, Max and Bo jump into the lake.  
After they swim, they dry off in the sun.  
Bo shakes the water off his fur. Max shakes the water out of his hair.

Then they go home to eat a snack.  
After a day at the park, Max and Bo like to take a nap.

#### Playing Games (Directive Story Format)

When I go in a room I will say hi to the person in the room with me.  
I can say “hello” or “hi” to them.

I should ask them to play.  
I can say, “Do you want to play with me?” or “Will you play this game with me?”

If they say yes I can open the game and have fun playing.

When I am finished playing my game,  
I can ask, “What game do you want to play?”

I can also pick up the game and bring it over to the table.  
If they say yes I can open the game, practice taking turns, and have fun playing.

When I am finished playing my game  
I can ask, “What game do you want to play?”  
I can also say, “Your turn to pick a game.

When they say the name of the game they want to play with me, I can say, “Yes, I will play with you.”

#### Appendix C: Getting Ready for School (Control Social Story)

Most children go to school from Monday to Friday.  
Before I go to school each morning, it is important to be ready.

My parents are happy when I get out of bed as soon as they wake me up.  
After I get out of bed, there are a lot of things to do.

Sometimes I take a shower in the morning.  
Showers make me feel clean, and they can be fun.

After I wash myself, it is important to dry off with a towel.  
I can rub my hair with a towel, or I can dry my hair with a blow-dryer.

Then it is time to put on my clothes.  
Sometimes my parents will tell me what to wear. I usually wear a new outfit every day.  
If it is cold outside, I can wear a sweater to keep me warm.

Many people like to eat breakfast. Sometimes I eat before I get dressed.  
Sometimes I eat breakfast after I get dressed.

I also need to comb my hair and brush my teeth in the morning.  
Brushing my teeth makes my breath smell good.

It’s a good idea to pack important things in my back-pack. I can pack a pencil and some paper.  
I can also bring a pencil sharpener and an eraser.

My teacher will be happy if I remember to bring my homework.  
Sometimes, I may bring lunch with me to school. I can put the lunch in my back-pack.

School usually begins at the same time every morning.  
My mom and dad like it when I get ready on time so that I won’t be late to school.

Before I leave home, it’s a good idea to make sure I have everything I need in my back-pack. When I get to school, I will feel good because I am clean and ready to start the day!

## Appendix D: Dependent Variable Scoring Criteria from Feinberg (2001)

### Greeting Behaviors

- 0 No attempt to verbally or nonverbally greet examiner. Also code 0 for verbal statements not related to a greeting.

Examples: *"I like ice cream"/"I want to go home"*

- 1 Child greets examiner nonverbally.

Examples: Child makes eye contact with, approaches, or waves to with examiner.

- 2 Child greets examiner with appropriate verbal language. Child does not need to make eye contact with the examiner.

Examples: *"Hello"/"Hi"/Hi Linda*

### Requesting to Play

- 0 No attempt to verbally or nonverbally to request playing a game with examiner. Child may go to games in room but doesn't approach the examiner to join. This coding also includes child walking around the room or talking with the examiner but not initiating play in any way.

- 1 Child nonverbally or verbally attempts to request playing a game. This also includes child making request statements toward examiner regarding the board games.

Examples: Child brings a game to examiner or to the table.

Child may request a game, "I want to play Connect Four."

- 2 Child verbally requests to play a game with examiner.

Examples: *"Do you want to play with me?"/"Let's play \_\_\_\_\_."*

### Asking What Another Wants to Play

- 0 Child makes no verbal or nonverbal attempt to ask what examiner wants to play or indicating it is their turn to choose a game. Also code 0 for verbal statements not related to asking what the examiner wants to play, or if the child gets up and wanders around the room or ignores the examiner.

Examples: *"I like to play games."*  
*"I want to play this game again."*

- 1 Child nonverbally attempts to ask examiner what they want to play.

Examples: Child approaches toys and looks at examiner.

- 2 Child verbally asks examiner what they want to play or verbally indicates their turn to pick the game.

Examples: *"What game do you want to play?"/"It's your turn to pick a game."*

### Accepting Another's Suggestion for a Game

- 0 Child does not accept examiner's choice of game. Child may refuse verbally or nonverbally.

Examples: *"I don't like that game."/"/"No!"/"Child may begin to play with other toys.*

- 1 Child nonverbally accepts examiner's choice

Examples: Child sits down and plays without verbally stating yes.

Child shakes or nods head yes.

- 2 Clear verbal acceptance of examiner's choice of game.

Examples: *"Yes"/"Sure"/"Uh-huh"/"Yes, I will play that with you."*

## References

- Adams, L., Gouvousis, A., VanLue, M., & Waldron, C. (2004). Social story intervention: Improving communication skills in a child with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities, 19*, 87–94. doi:10.1177/10883576040190020301.
- Agosta, E., Graetz, J. E., Mastropieri, M. A., & Scruggs, T. E. (2004). Teacher-researcher partnerships to improve social behavior through social stories. *Intervention in School and Clinic, 39*, 276–287. doi:10.1177/10534512040390050401.
- Ali, S., & Fredrickson, N. (2006). Investigating the evidence base of social stories. *Educational Psychology in Practice, 22*, 355–377. doi:10.1080/02667360600999500.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.
- Andrews, S. (2004). Using social stories to increase reciprocal social interactions and social comprehension in school aged children diagnosed with autism (Doctoral dissertation, California School of Professional Psychology, San Diego). *Dissertation Abstracts International*.
- Attwood, T. (2000). Strategies for improving the social integration of children with Asperger syndrome. *Autism: The International Journal of Research and Practice, 4*, 85–100.
- Bäckman, B., & Pilebro, C. (1999). Augmentative communication in dental treatment of a nine-year-old boy with Asperger syndrome. *Journal of Dentistry for Children, 66*, 419–420.

- Bader, R. (2006). Using social stories to increase emotion recognition and labeling in school-age children with autism (Doctoral dissertation, California School of Professional Psychology, San Diego). *Dissertation Abstracts International*.
- Barry, L. M., & Burlew, S. B. (2004). Using social stories to teach choice and play skills to children diagnosed with autism. *Focus on Autism and Other Developmental Disabilities, 19*, 45–51. doi:10.1177/10883576040190010601.
- Bernad-Ripoll, S. (2007). Using a self-as-model video combined with social stories to help a child with Asperger Syndrome understand emotions. *Focus on Autism and Other Developmental Disabilities, 22*, 100–106. doi:10.1177/10883576070220020101.
- Blaxill, M. (2004). What's going on? The question of time trends in autism. *Public Health Reports, 119*, 536–550. doi:10.1016/j.phr.2004.09.003.
- Bledsoe, R., Myles, B. S., & Simpson, R. (2003). Use of a social story intervention to improve mealtime skills of an adolescent with Asperger syndrome. *Autism: The International Journal of Research and Practice, 7*, 289–295.
- Briody, J., & McGarry, K. (2005). Using social stories to ease children's transitions. *Young Children, 60*, 38–43.
- Brownell, M. D. (2002). Musically adapted social stories to modify behaviors in students with autism: Four case studies. *Journal of Music Therapy, 2*, 117–144.
- Bucholz, J. (2007). Using social stories and literacy based behavioral interventions to improve employment skills in employees with mental retardation (Doctoral dissertation, Florida Atlantic University). *Dissertation Abstracts International*.
- Burke, R. V., Kuhn, B. R., & Peterson, J. L. (2004). Brief report: A "storybook" ending to children's bedtime problems—the use of a rewarding social story to reduce bedtime resistance and frequent night waking. *Journal of Pediatric Psychology, 29*, 389–396. doi:10.1093/jpepsy/jsh042.
- Carbo, B. C. (2005). The use of social stories with individuals with Autism Spectrum Disorders (Master Thesis, University of Delaware). *Dissertation Abstracts International*.
- Chapman, L., & Trowbridge, M. (2000). Social stories for reducing fear in the outdoors. *Horizons, 121*, 38–40.
- Crozier, S., & Sileo, N. M. (2005). Encouraging positive behavior with social stories. *Teaching Exceptional Children, 37*, 26–31.
- Crozier, S., & Tincani, M. (2005). Using a modified social story to decrease disruptive behavior of a child with autism. *Focus on Autism and Other Developmental Disabilities, 20*, 150–157. doi:10.1177/10883576050200030301.
- Crozier, S., & Tincani, M. (2007). Effects of social stories on prosocial behavior of preschool children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 37*, 1803–1814. doi:10.1007/s10803-006-0315-7.
- Cullain, R. E. (2000). The effects of social stories on anxiety levels and excessive behavioral expressions of elementary school-aged children diagnosed with autism (Doctoral Dissertation: The Union Institute). *Dissertation Abstracts International*.
- Daneshvar, S. D. (2006). A comparison of steps to social success (SSS) and social stories for teaching social skills to children with autism (Doctoral Dissertation: Claremont Graduate University). *Dissertation Abstracts International*.
- Delano, M., & Snell, M. E. (2006). The effects of social stories on the social engagement of children with autism. *Journal of Positive Behavior Interventions, 8*, 29–42. doi:10.1177/10983007060080010501.
- Del Valle, P. R., McEachern, A. G., & Chambers, H. D. (2001). Using social stories with autistic children. *Journal of Poetry Therapy, 14*, 187–197. doi:10.1023/A:1017564711160.
- Demiri, V. (2004). Teaching social skills to children with autism using social stories: An empirical study (Doctoral dissertation, Hofstra University). California School of Professional Psychology, San Diego. *ProQuest Dissertations and Theses*.
- Dentato, K. (2006). Effects of sequential social stories series on social register in individuals with autism (Doctoral dissertation: Hofstra University). *Dissertation Abstracts International*.
- Department of Developmental Services. (1999). *Changes in the population of persons with autism and pervasive developmental disorders in California's developmental services system: 1987 through 1998*. A Report to the Legislature March 1, Sacramento, CA: California Health and Human Services Agency.
- Department of Developmental Services. (2003). *Autistic Spectrum Disorders. Changes in the California Caseload. An Update: 1999 through 2002* (April). Sacramento, CA: California Health and Human Services Agency.
- Dodd, S., Stephen, D., Hupp, A., Jewell, J. D., & Krohn, E. (2007). Using parents and siblings during a social story intervention for two children diagnosed with PDD-NOS. *Journal of Developmental and Physical Disabilities, 20*, 217–229. doi:10.1007/s10882-007-9090-4.
- Feinberg, M. J. (2001). Using social stories to teach specific social skills to individuals diagnosed with autism (Doctoral dissertation, California School of Professional Psychology, San Diego). *Dissertation Abstracts International*.
- Goldstein, G., Beers, S. R., Siegel, D. J., & Minshew, N. J. (2001). A comparison of WAIS-R profiles in adults with High-Functioning Autism or differing subtypes of Learning Disability. *Applied Neuropsychology, 8*, 148–154. doi:10.1207/S15324826AN0803\_3.
- Graetz, J. E. (2003). Promoting social behaviors for adolescents with autism using social stories (Doctoral dissertation, George Mason University). *Dissertation Abstracts International*.
- Gray, C. Social Story website: <http://www.thegraycenter.org/>
- Gray, C. (1993). *The original social stories book*. TX: Future Horizons.
- Gray, C. (1994; 2000). *The new social stories book*. Texas: Future Horizons.
- Gray, C. (1995). Teaching children diagnosed with autism to "read" social situations. In K. Quill (Ed.), *Teaching children diagnosed with autism: Strategies to enhance communication and socialization* (pp. 219–241). Albany, NY: Delmar.
- Gray, C. A. (1998). Social stories and comic strip conversations with students with Asperger Syndrome and high-functioning autism. In G. Schopler, et al. (Eds.), *Asperger syndrome or high-functioning autism?* (pp. 167–198). New York: Plenum Press.
- Gray, C. A., & Garand, J. D. (1993). Social stories: Improving responses of students with autism with accurate social information. *Focus on Autistic Behavior, 8*, 1–10.
- Gray, C., & Leigh White, A. (2002). *My social stories book*. London: Jessica Kingsley Publishers, LTD.
- Greenway, C. (2000). Autism and Asperger syndrome: Strategies to promote prosocial behaviors. *Educational Psychology in Practice, 16*, 469–486.
- Gut, D. M., & Safran, S. P. (2002). Cooperative learning and social stories: Effective social skills strategies for reading teachers. *Reading and Writing Quarterly, 18*, 87–91.
- Haggerty, N. K., Black, R. S., & Smith, G. J. (2005). Increasing self-managed coping skills through social stories and apron storytelling. *Teaching Exceptional Children, 37*, 40–47.
- Hagiwara, T. (1998). Multimedia social story intervention for students with autism (Doctoral Dissertation, University of Kansas). *Dissertation Abstracts International*.
- Hagiwara, T., & Myles, B. S. (1999). A multimedia social story intervention: teaching skills to children diagnosed with autism. *Focus on Autism and other Developmental Disabilities, 14*, 82–95.
- Hess, K. L., Morrier, M. J., Heflin, L. J., & Ivey, M. L. (2008). Autism treatment survey: Services received by children with autism

- spectrum disorders in public school classrooms. *Journal of Autism and Developmental Disorders*, 38, 961–971.
- Howell, E. (2005). Teacher perceptions on the effectiveness of social stories and comic strip conversations for students with autism spectrum disorder. Masters Thesis, California State University, Fullerton, Dissertation Abstracts International.
- Hutchins, T. L., & Prelock, P. A. (2006). Using social stories and comic strip conversations to promote socially valid outcomes for children with autism. *Seminars in Speech and Language*, 27, 47–59.
- Ivey, M. L., Heflin, J., & Alberto, P. (2004). The use of social stories to promote independent behaviors in novel events for children with PDD-NOS. *Focus on Autism and Other Developmental Disabilities*, 19, 164–176.
- Kalyva, E., & Agaliotis, I. (2008). Can social stories enhance the interpersonal conflict resolution skills of children with LD? *Research in Developmental Disabilities*, 1–11, available online at Science Direct (in press).
- Keyworth, P. L. W. (2004). The effects of social stories on the social interactions of students with autism. Doctoral Dissertation, The University of Iowa, ProQuest Dissertations and Theses.
- Kuoch, H., & Mirenda, P. (2003). Social story interventions for young children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 18, 219–227.
- Kuttler, S., Myles, B. S., & Carlson, J. K. (1998). The use of social stories to reduce precursors to tantrum behavior in a student with autism. *Focus on Autism and other Developmental Disabilities*, 13, 176–182.
- Lincoln, A. J., Courchesne, E., Kilman, B. A., Elmasian, R., & Allen, M. (1988). A study of intellectual abilities in high-functioning people with autism. *Journal of Autism and Developmental Disorders*, 18, 505–524.
- Lord, C., Rutter, M., DiLavore, P. C., & Risi, S. (1999). *Autism diagnostic observation schedule-WPS (ADOS-WPS)*. Los Angeles, CA: Western Psychological Services.
- Lorimer, P. A., Simpson, R. L., Myles, B. S., & Ganz, J. B. (2002). The use of social stories as a preventative behavioral intervention in a home setting with a child with autism. *Journal of Positive Behavioral Interventions*, 4, 53–60.
- Markwardt, F. C. (1989). *Manual for the peabody individual achievement test—revised*. American Guidance Services.
- Marr, D., Mika, H., Miraglia, J., Roerig, M., & Sinnott, R. (2007). The effect of sensory stories on targeted behaviors in preschool children with autism. *Physical and Occupational Therapy in Pediatrics*, 27, 63–79.
- M.I.N.D. Institute. (2002). *Report to the Legislature on the Principle Findings from the Epidemiology of Autism in California*. Sacramento, CA: University of California, Davis.
- Moore, P. S. (2004). The use of social stories in a psychology service for children with learning disabilities: a case study of a sleep problem. *British Journal of Learning Disabilities*, 32, 133–138.
- More, C. (2008). Digital stories targeting social skills for children with disabilities: Multidimensional learning. *Sage Publications*, 43, 168–177.
- Myles, B. S., & Simpson, R. L. (2001). Understanding the hidden curriculum: An essential social skill for children and youth with Asperger syndrome. *Intervention in School and Clinic*, 36, 279–286.
- Nichols, S. (2005). Review of social story interventions for children diagnosed with autism spectrum disorders. *Journal of Evidence-Based Practices for Schools*, 6, 90–120.
- Norris, C., & Dattilo, J. (1999). Evaluating effects of a social story intervention on a young girl with autism. *Focus on Autism and other Developmental Disabilities*, 14, 180–186.
- Okada, S., Ohtake, Y., & Yanagihara, M. (2008). Effects of perspective sentences in social stories TM on improving the adaptive behaviors of students with autism spectrum disorders and related disabilities. *Education and Training in Developmental Disabilities*, 43, 46–60.
- Ozdemir, S. (2008). The effectiveness of social stories on decreasing disruptive behaviors of children with autism: Three case studies. *Journal of Autism and Developmental Disorders*, available online publication.
- Pasiali, V. (2004). The use of prescriptive therapeutic songs in a home-based environment to promote social skills acquisition by children with autism: Three case studies. *Music Therapy Perspectives*, 22, 11–20.
- Pettigrew, J. (1998). Effects of the modeling of verbal and nonverbal procedures for interaction with peers through social stories and scaffolded activities on the social competence of 3- and 4-year-old children with specific language impairments. Dissertation Abstracts International.
- Quilty, K. M. (2007). Teaching paraprofessionals how to write and implement social stories for students with autism spectrum disorders. *Remedial and special education*, 28, 182–189.
- Reynold, G., & Carter, M. (2006). Social stories for children with disabilities. *Journal of Autism and Developmental Disorders*, 36, 445–469.
- Ricciardelli, D. (2006). A social skills program evaluation: Will social stories combined with a traditional social skills curriculum increase pro-social behavior in autistic children? Doctoral dissertation, Farleigh Dickinson University, Proquest Dissertations and Theses.
- Rogers, M. F., & Myles, B. S. (2001). Using social stories and comic strip conversations to interpret social situations for an adolescent with Asperger Syndrome. *Intervention in School and Clinic*, 38, 310–313.
- Romano, J. (2002). Are social stories effective in modifying behavior in children with autism? Doctoral Dissertation, Farleigh Dickinson University. Dissertation Abstracts International.
- Rowe, C. (1999). Do social stories benefit children diagnosed with autism in mainstream primary schools? *British Journal of Special Education*, 26, 12–14.
- Rust, J., & Smith, A. (2006). How should the effectiveness of social stories to modify the behavior of children on the autistic spectrum be tested? Lessons from the literature. *SAGE Publications and The National Autistic Society*, 10, 125–138.
- Salazar, S. (2004). Increasing social initiations in preschoolers with autism using a combination of social stories, pictorial cues and role play. Dissertation Abstracts International.
- Sansosti, F. J., Powell-Smith, K. A., & Kincaid, D. (2004). A research synthesis of social story interventions for children diagnosed with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, 19, 194–204.
- Scattone, D. (2002). Increasing appropriate social interactions of children with autistic spectrum disorders using social stories. Doctoral dissertation, University of Southern Mississippi, Dissertation Abstracts International.
- Scattone, D. (2007). Social skills interventions for children with autism. *Psychology in the Schools*, 44, 717–726.
- Scattone, D. (2008). Enhancing the conversation skills of a boy with Asperger's Disorder through social stories<sup>TM</sup> and video modeling. *Journal of Autism and Developmental Disorders*, 38, 395–400.
- Scattone, D., & Knightt, K. R. (2006). Current trends in behavioral interventions for children with autism. *Catania in Autism Spectrum Disorders*, 72, 181–193.
- Scattone, D., Tingstrom, D. H., & Wilczynski, S. M. (2006). Increasing appropriate social interactions of children with autism spectrum disorders using social stories. *Focus on Autism and Other Developmental Disabilities*, 21, 211–222.
- Scattone, D., Wilczynski, S. M., Edwards, R. P., & Rabian, B. (2002). Decreasing disruptive behaviors of children diagnosed with



- autism using social stories. *Journal of Autism and Developmental Disorders*, 32, 535–543.
- Schenk-Kornberg, A. F. (2007). The effectiveness of social stories on students with Autism Spectrum Disorder. Master Thesis: Caldwell College. Proquest Dissertations and Theses.
- Simpson, R. (1993). Tips for practitioners: Reinforcement of social story compliance. *Focus on Autistic Behavior*, 8, 15–16.
- Simpson, R. L., & Myles, B. S. (1998). Aggression among children and youth who have Asperger's Syndrome: A different population requiring different strategies. *Preventing School Failure*, 42, 149–153.
- Smith, C. (2001). Using social stories to enhance behavior in children with autistic spectrum difficulties. *Educational Psychology in Practice*, 17, 337–345.
- Soenksen, D., & Alper, S. (2006). Teaching a young child to appropriately gain attention of peers using a social story intervention. *Focus on Autism and other Developmental Disabilities*, 21, 36–44.
- Staley, M. J. (2001). An investigation of social-story effectiveness using reversal and multiple-baseline designs. Doctoral dissertation, University of Kansas, Dissertation Abstracts International.
- Swaggart, B. L., Gagnon, E., Bock, S. J., Earles, T. L., Quinn, C., Myles, B. S., et al. (1995). Using social stories to teach social and behavioral skills to children diagnosed with autism. *Focus on Autistic Behavior*, 10, 1–16.
- Swaine, J. M. (2004). Teaching language skills to children with autism through the use of social stories. Doctoral dissertation, Dalhousie University. Dissertation Abstracts International.
- Tarnai, B., & Wolfe, P. S. (2008). Social stories for sexuality education for persons with autism/pervasive developmental disorder. *Sexuality and Disability*, 26, 29–36.
- Thiemann, K. S., & Goldstein, H. (2001). Social stories, written text cues, and video feedback: Effects on social communication of children diagnosed with autism. *Journal of Applied Behavior Analysis*, 34, 425–446.
- Thomson, J. (1993). Communication success under specific conditions: autistic children age 6 to 19 and control children respond to comments under varying cue conditions and types of cues. Doctoral Dissertation, California School of Professional Psychology San Diego. Dissertation Abstracts International.
- Toplis, R., & Hadwin, J. A. (2006). Using social stories to change problematic lunchtime behavior in school. *Educational Psychology in Practice*, 22, 53–67.
- Travis, D. A. (2006). The effect of musical social stories™ on target behaviors of preschool children with autism spectrum disorders: Three case studies. Doctoral dissertation, Michigan State University, Dissertation Abstracts International.
- Washburn, K. P. (2006). The effects of a social story intervention on social skills acquisition in adolescents with Asperger's Syndrome. Doctoral dissertation, University of Florida, Dissertation Abstracts International.
- Wechsler, D. (2003). *Wechsler intelligence scales for children* (4th ed.). San Antonio, TX: The Psychological Corporation.
- Wheeler, K. L. (2005). The power of social stories: A strategy for students with autism spectrum disorder. Master thesis, California State University, Fullerton. Proquest Dissertations and Theses.
- Weiss, M. J., & Harris, S. L. (2001). Teaching social skills to people with autism. *Behavior Modification*, 25, 785–802.
- Zimelman, M., Paschal, A., Hawley, S. R., Molgaard, C. A., & St. Romain, T. (2007). Addressing physical inactivity among developmentally disabled students through visual schedules and social stories. *Research in Developmental Disabilities*, 28, 386–396.